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EXAMINER	
SWEENEY, PATRICK E	
ART UNIT	**PAPER NUMBER**
2169	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/812,634	MERRILL ET AL.	
	Examiner	Art Unit	
	Patrick E. Sweeney	2169	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to applicant's communication filed May 24, 2007 in response to PTO Office Action dated January 19, 2007. The Applicant's remarks and amendments to the claims and/or the specification were considered with the results that follow.

2. Claims 1-20 have been presented for examination in this application. In response to the last Office Action, claims 1 and 10 have been amended. Claims 16-20 have been added. As a result, claims 1-20 are now pending in this application.

3. As to Applicant's Arguments/Remarks filed May 24, 2007, please see Examiner's response in "***Response to Arguments***", following this Office Action for Final Rejection (hereafter "the Action"), shown next.

Drawings

4. The drawings were received on May 24, 2007. These drawings are acceptable. The examiner withdraws the objections to the drawings.

Specification

5. In light of the amended drawings and specification the examiner withdraws the objections to the specification.

Response to Amendment

Claim Objections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. The term "approximately" in claim 17 is a relative term which renders the claim indefinite. The term "approximately" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "approximately" does not adequately indicate the degree to which the collective read rate is similar to the network transfer rate.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stallmo (US 5,875,456) in view of Lee et al. ("Applied Techniques for High Bandwidth Data Transfers across Wide Area Networks").

10. Claim 1: Claim 1: Stallmo discloses a method of preconditioning data, the method comprising,

a. Causing data to be moved from a first storage subsystem having a first data read rate to a plurality of second storage subsystems having a collective read rate of greater magnitude that the collective read rate (Column 6, Lines 7-13); and

b. Causing the data to be read out of the plurality of second storage subsystems at the collective read rate (Column 2, Lines 22-24).

Stallmo does not explicitly disclose that the preconditioned data is to be read out on a switched underlay network. However, Lee discloses using RAID techniques to transmit the preconditioned data over a network (Page 3, Paragraphs 6-8. Lee discloses drawing data from multiple striped discs to be transmitted over a network). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to transmit the preconditioned data over a switched underlay network. One would have been motivated to transmit the data from a plurality of devices over a network to accommodate larger file transfers faster than a single device could manage. And one would have been motivated to transfer the data over a switched underlay network since it is a type of network and the data would receive the same benefit of transferring files faster than a single device could manage.

11. Claim 10: Stallmo discloses an apparatus for preconditioning data to be transferred on a switched underlay network, the apparatus comprising:

a. An interface to a storage subsystem containing a file to be transferred, the storage subsystem having a data output interface having a first data read rate (Column 1, Lines 46-67);

b. Control logic configured to generate instructions to the storage subsystem to cause the storage subsystem to precondition the data by transferring portions of the file to a plurality of second storage subsystem from which the data may be read at a collective data read rate greater than the first data read rate (Column 1, Lines 46-67).

Stallmo does not explicitly disclose that the preconditioned data is read onto a switched underlay network. However, Lee discloses using RAID techniques to transmit the preconditioned data over a network (Page 3, Paragraphs 6-8. Lee discloses drawing data from multiple striped discs to be transmitted over a network). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to transmit the preconditioned data over a switched underlay network. One would have been motivated to transmit the data from a plurality of devices over a network to accommodate larger file transfers faster than a single device could manage. And one would have been motivated to transfer the data over a switched underlay network since it is a type of network and the data would receive the same benefit of transferring files faster than a single device could manage.

12. Claim 2: Stallmo and Lee disclose a method of preconditioning data as in Claim 1 above, but do not explicitly disclose that the transfer rate of the first storage

subsystem would be less than that of the transfer network. However Stallmo discloses that the first storage subsystem can be a disk device (Column 1, Lines 16-19). The applicant discloses that conventionally disk drives and other storage systems have outputs ranging from 10-100 Megabits per second, and in some cases as much as 4 gigabits per second. The applicant also discloses that it is currently known in the art that switched optical networking is capable of handling large data transfers, enabling transfer rates of at least 10 Gigabits per second. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to implement Stallmo's invention using a conventional storage system, meaning one with a transfer rate of 10 Mbps to 4 Gbps, on a switched optical network with a transfer rate of at least 10 Gbps. One would have been motivated to do this because of the greater speed is always desirable in the computer arts.

13. Claim 3: Stallmo and Lee disclose a method as in Claim 1 above, and Stallmo further discloses that:

a. The plurality of second storage subsystems comprises the first storage subsystem and additional storage subsystems (Column 6, Lines 7-13).

14. Claim 4: Stallmo and Lee disclose a method of preconditioning data as in Claim 1 above, but do not explicitly disclose that the data is to be multiplexed by a network element (which the applicant discloses can be servers, computers, nodes, routers, switches, hubs, proxies, and other devices). However Stallmo does disclose that a

RAID system can multiplex data from a plurality of discs, either through hardware or software implementation, i.e. a RAID controller or a computer (Column 1, Lines 56-67). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a computer to perform the multiplexing duties and connect that computer to a network. One would have been motivated to connect the computer to a network in order to conveniently transfer data.

15. Claim 5: Stallmo and Lee disclose a method of preconditioning data as in Claim 4 above, but do not explicitly disclose that the secondary storage subsystems are geographically closer to the network element than the first storage subsystem. However, Official Notice is taken that it is old and well known within the computing arts that transmissions across networks are not instantaneous and transmission time increases with the distance the signal must travel. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to position the storage systems that would be performing the data transfer geographically close to the network element and the network. One would have been motivated to position the second storage systems geographically closer to the network element in order to increase the speed of transfer.

16. Claim 6: Stallmo and Lee disclose a method of preconditioning data as in Claim 4 above, and Lee further discloses that the secondary storage subsystems are

connected to the network element over links having higher bandwidth than the first storage subsystem (Page 4, Paragraph 5).

17. Claim 7: Stallmo and Lee disclose a method as in Claim 1 above, and Stallmo further discloses that:

a. The step of causing the data to be moved from the first storage subsystem comprises dividing the data into sections, and moving each of the sections to at least one of the second storage subsystems (Column 6, Lines 7-13).

18. Claim 8: Stallmo and Lee disclose a method of preconditioning data as in Claim 1 above, but do not explicitly disclose that the collective read rate is based on individual read rates of the each of the second storage subsystems. However, the definition of collective is that it is, or is related to, a group of individuals. The collective read rate must be based on the individual read rates of the collective, there is no other way to obtain a collective read rate. If a collective read rate were specified to be something other than the maximum possible read rate of the plurality of secondary storage devices it would still be physically constrained by the individual read rates of each of the second storage subsystems, and thus it must be based on the individual read rates of each of the second storage subsystems.

19. Claim 9: Stallmo and Lee disclose a method of preconditioning data as in Claim 1 above, but do not explicitly disclose a pattern for reading data from the second

storage subsystems nor communicating that pattern to a target subsystem. However, as a RAID controller can be software implemented, i.e. a computer can function as the RAID controller, the multiplexing function of the RAID controller can be performed at either the source, or the target destination, as long as the target destination has some information about how the data should be multiplexed. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to communicate the manner in which the data was read (the pattern) to the target storage subsystem for multiplexing purposes. One would have been motivated to do this to relieve the cpu of the source computer of the task, thus keeping it free for tasks more important than data transmission.

20. Claim 11: Stallmo and Lee disclose an apparatus of preconditioning data as in Claim 11 above, but do not explicitly disclose control logic for generating a pattern for reading data from the second storage subsystems. However, as a RAID controller can be software implemented, i.e. a computer can function as the RAID controller, the multiplexing function of the RAID controller can be performed at either the source, or the target destination, as long as the target destination has some information about how the data should be multiplexed. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to communicate the manner in which the data was read (the pattern) to the target storage subsystem for multiplexing purposes using control logic. One would have been motivated to do this to relieve the

cpu of the source computer of the task, thus keeping it free for tasks more important than data transmission, and would need control logic to generate the pattern.

21. Claim 12: Stallmo and Lee disclose an apparatus as in Claim 10 above, and Stallmo further discloses that

a. The instructions generated by the control logic cause the file to be divided into sections, each section of which comprises a portion of the file (Column 6, Lines 7-13).

22. Claim 13: Stallmo and Lee disclose an apparatus as in Claim 10 above, and Stallmo further discloses that the portions of the file are copies of the file (Column 2, Lines 32-41).

23. Claim 14: Stallmo and Lee disclose an apparatus for preconditioning data as in Claim 10 above, but do not explicitly disclose control logic to generate a pattern for reading data from the second storage subsystems. However, as a RAID controller can be software implemented, i.e. a computer can function as the RAID controller, the multiplexing function of the RAID controller can be performed at either the source, or the target destination, as long as the target destination has some information about how the data should be multiplexed. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to communicate the manner in which the data was read (the pattern) to the target storage subsystem for multiplexing

purposes, and therefore to implement control logic to generate the pattern. One would have been motivated to do this in order to transmit the pattern, since it must be generated before it can be transmitted.

24. Claim 15: Stallmo and Lee disclose an apparatus for preconditioning data as in Claim 14 above, but do not explicitly disclose the use of buffering instructions to the network element, nor instructions to identify the second storage subsystems that will provide the data to be transferred on the reserved resources. However the transmission of data requires some instructions or hardware control logic to either transfer the data directly from the non-volatile storage devices, or to read the data into volatile storage devices such as RAM which can then transfer the data to the network (i.e. there must be some instruction to dictate the type of buffering used). Likewise it would be necessary for the network element to know the identity of the second storage subsystems in order to pull the data from them. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to implement control logic to control the type of buffering to be used in the data transmission, as well as control logic to identify each of the second storage subsystems. One would have been motivated to do this because both steps are necessary requirements for the transmission of the data.

25. Claim 16: Stallmo and Lee disclose the method of Claim 1 above, but do not explicitly disclose that the switched underlay network is a high bandwidth wavelength

switched optical network. However Lee discloses a method for transferring data over a network to take advantage of the networks greater bandwidth by transferring files from a plurality of sources at once (Page 3, Paragraphs 6-8). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made that the network the data was being transferred over could be a high bandwidth wavelength switched optical network. One would have been motivated to transfer the data over a high bandwidth wavelength switched optical network because it is a type of network, and one that has a high bandwidth, meaning that the data will travel faster if the multiple devices had previously supplied data faster than the network could transfer it.

26. Claim 17: Stallmo and Lee disclose the method of Claim 2 above, but do not explicitly disclose that the collective read rate is approximately the data transfer rate of the switched underlay network. However Lee discloses saturating transfer devices, such as a disc controller or a router, with the data to be transferred (Page 3, Paragraph 6). Therefore it would have been obvious to one having ordinary skill in the art to attempt to saturate the network capabilities, supplying a collective read rate approximately equal to the transfer rate of the network. One would have been motivated to supply a read rate approximately equal to the transfer rate to maximize the throughput of data.

27. Claim 18: Stallmo and Lee disclose the method of Claim 1 above, and Lee further discloses that several disks, or a disk array, can exist on one server that acts as a secondary storage subsystem (Page 3, Paragraphs 7-9).

28. Claim 19: Stallmo and Lee disclose the method of Claim 18 above, and Lee further discloses that the within each of the second storage subsystems is stored in the disk array using a Redundant Array of Independent Disks (RAID) algorithm (Page 3, Paragraphs 6-9. Lee discloses striping data according to a RAID algorithm across several servers, each server possibly having several disks with striped raid data).

29. Claims 2-15: Claims 2-15 are rejected for the same reasons listed in the original office action, provided above, now as the combination of Stallmo and Lee.

30. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stallmo (US 5,875,456) in view of Lee et al. ("Applied Techniques for High Bandwidth Data Transfers across Wide Area Networks") as applied to claims 1-19 above, and further in view of Baek et al. (Reliability and Performance of Hierarchical RAID with Multiple Controllers).

31. Claim 20: Stallmo and Lee disclose the method of Claim 19 above, but do not explicitly disclose that the step of causing data to be moved from the first storage subsystem to the plurality of second storage subsystems causes data to be allocated

between the second subsystem using a RAID algorithm to implement a nested RAID storage hierarchy. However Baek discloses hierarchical RAID storage systems, specifically combinations of Raid 3 and 1, and Raid 5 and 1, resulting in systems that stripe data, store parity information about the data, and mirror the data and the parity (Page 246, Paragraph 10). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to store the data in the secondary subsystems according to a hierarchical Raid algorithm. One would have been motivated to use a hierarchical Raid algorithm to support the striping of data for speed of access, as well as redundancy of data to protect against data loss.

Response to Arguments

32. Applicant's arguments, filed May 24, 2007 with respect to claims 1-15 have been fully considered, please see discussions below:
Concerning previous rejections of claims 1-15, Applicant kindly explained difference of teaching between the application and the cited Stallmo reference. In responding to amendment made to the independent claims, Examiner has introduced the Lee and Baek references for making up deficiencies of the Stallmo reference.

33. As per [0001]-[007] (of Applicant's argument concerning claims 1-15), Examiner respectfully submits that the original claims were directed toward a method of preconditioning data for transfer over a network, but that none of the limitations of the

claims involved transferring the data over a network. Therefore it is the examiner's position that the intended se of the preconditioning held no patentable weight, since the claims were only directed toward a preconditioning method, which the Stallmo reference adequately disclosed.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick E. Sweeney whose telephone number is (571) 270-1687. The examiner can normally be reached on Mon. - Fri. (Alternate Fridays Off) EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pierre Vital can be reached on (571) 272-4215. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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July 11, 2007

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